



DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES STATE OF FLORIDA

Bob Graham, Governor

DISTRICT EIGHT

POLK COUNTY HEALTH DEPARTMENT

WILLIAM F. HILL, JR., M.D.
DIRECTOR

P.O. BOX 1480
229 AVENUE D, N.W.
WINTER HAVEN, FLORIDA
33880

RADIOLOGICAL & OCCUPATIONAL HEALTH
225 AVENUE 'D', N.E.
P. O. BOX 1480
WINTER HAVEN, FLORIDA
33880

(813) 294-7481 Ext. 276

February 11, 1982

DIRECT SERVICE UNITS

1755 HOLLAND PKWY., SOUTH
BARTOW, FLORIDA 33830

111 NORTH 11TH STREET
HAINES CITY, FLORIDA 33844

305 WEST CENTRAL AVENUE
LAKE WALES, FLORIDA 33853

103 EAST CANAL STREET
MULBERRY, FLORIDA 33860

DIRECT SERVICE UNITS

1333 NORTH FLORIDA AVENUE
LAKELAND, FLORIDA 33801

P.O. BOX 33
WAVERLY, FLORIDA 33877

2 NORTH REEDY BLVD.
FROSTPROOF, FLORIDA 33843

243 E. LAKE AVENUE
AUBURNDALE, FLORIDA 33823


SITE: Florida Phosphate
BREAK: 17.8
OTHER: 17

Dr. David Boris
Florida Institute of Phosphate Research
P. O. Box 877
Bartow, Florida 33830

Dr. David Boris:

Enclosed is the data pertaining to the Institutes new building. If we may be of further help to you concerning this matter, please feel free to contact me.

Sincerely,


Harlan Keaton
Public Health Physicist III



10517212

POLK COUNTY HEALTH DEPARTMENT

FIELD REPORT ON Florida Institute of Phosphate Research

TOWN VISITED State Road 60, Bartow, Florida

DATE _____

OWNER OF PROPERTY _____

PERSON SEEN _____

BY WHOM Norman M. Gilley; James W. Nall

TIME SPENT _____

REASON FOR VISIT _____

REPORT: As requested by Dr. David Boris, soil samples were taken of the clay-sand mix utilized for the foundation of the new Institute building. Since the original soil strata did not adequately meet compaction specification, soils located on the north boundary of the site were utilized. This clay-sand mixture did meet the required compaction specification.

The building site was measured by calibrated scintillation rate meter, Ludlum 12S, both before and after the soil mixture was moved into the foundation area. The original exposure rate was found to be approximately 12 microR/hour gamma exposure at a height of 3 feet. The rate rose to approximately 27 microR/hour within the foundation area after back filling with the new soils.

Radon flux levels were measured by the charcoal canister technique. Mean flux rate was 5.53 pCi/m², sec for a sample size of 21 measurements with a standard deviation of 1.89 pCi/m².second. The flux ranged from 1.84 to 9.03 within this sampling group. Flux measurements were made on the original soil strata with a mean flux of 2.02 pCi/m².sec.; standard deviation -0.97, ranging from 0.6 to 3.9 pCi/m².sec.

The Radium-226 content of the original soils were measured by the Radon Emanation Technique. (see enclosed table)

A comparison with another parcel of property may be drawn from the following table: (Please note that control technologies were utilized in the construction of the building.)

FLORIDA INSTITUTE

	<u>Before Addition of Clay-Sand Mix</u>	<u>After Addition of Clay-Sand Mix</u>	<u>Comparison Site</u>
Soil Radium	4.81 pCi/gram SD(N-1) 0.59	5.6, 12.8, 13.1 & 16.6 pCi/gram	15.8 pCi/gram SD (N-1) = 1.55
Rnflux	2.02 pCi/m2sec SD(N-1) 0.97	5.53 pCi/m2sec SD (N-1) = 1.89	5.44 pCi/m2sec SD (N-1) 2.51
Gamma Exposure	12 uR/hr	27 uR/hr	25 uR/hr
Indoor WL	Not applicable	Not applicable	0.019 WL SD (N-1) 0.0014

SOIL CORE SAMPLES† (0-6') Ra 226 IN pCi/gram

L^B (each Interval tested)

0 - 1'	4.9 ± .1*
1 - 2'	4.2 ± .1
2 - 3'	5.3 ± .1
3 - 4'	4.8 ± .1
4 - 5'	4.9 ± .1
5 - 6'	5.7 ± .2

A (composite) 5.4 ± .1

B 4.7 ± .1

C 4.3 ± .1

D 5.4 ± .1

The following cores were taken from undisturbed soil on the north side of Highway 60.

E 3.8 ± .1

F 2.6 ± .1

G 2.3 ± .1

The following samples are not cores. They were taken from the spoil bank used for fill for the foundation.

A'. 11.8 ± .2

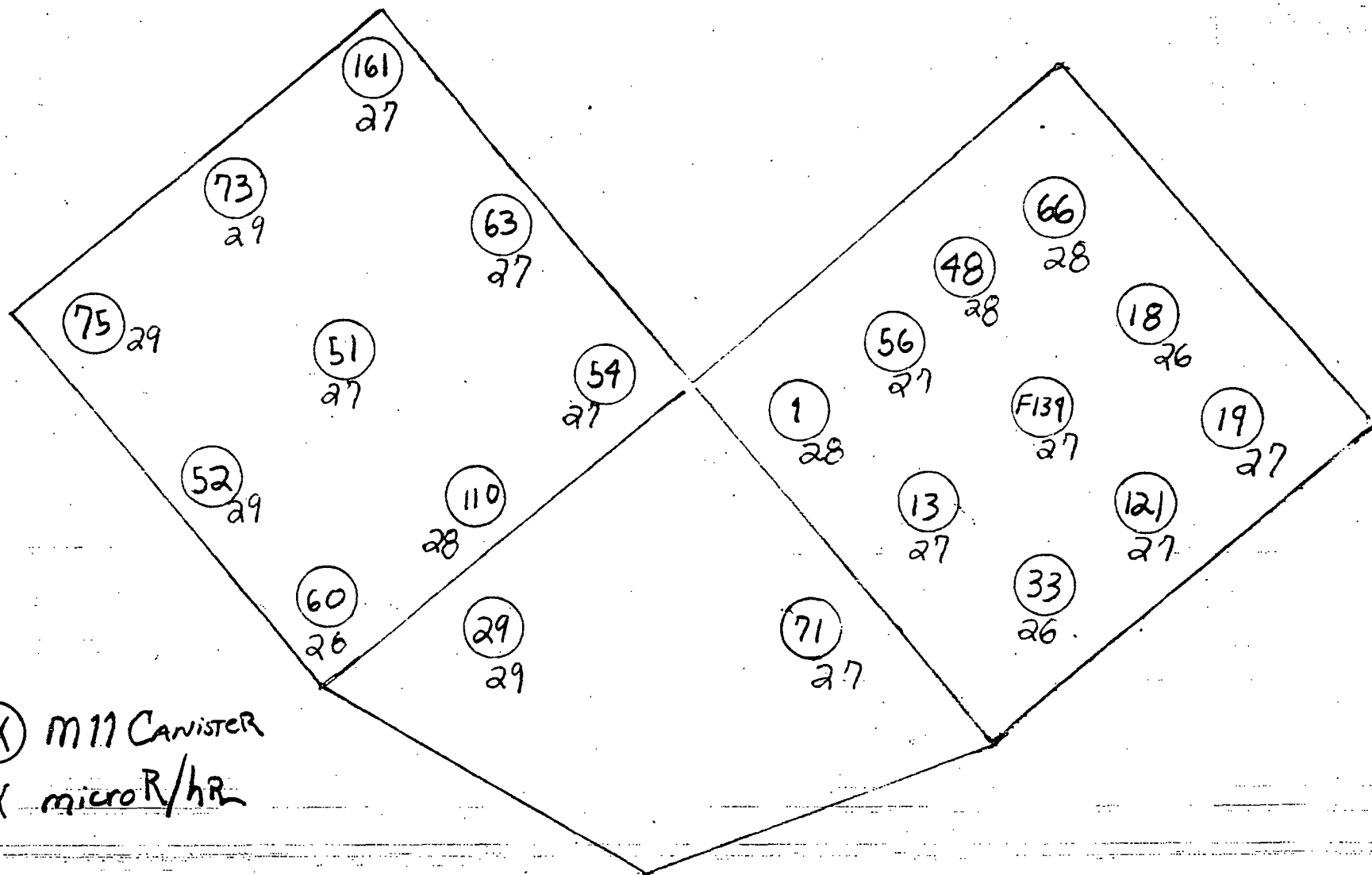
B'. 13.4 ± .2

C'. 16.3 ± .2

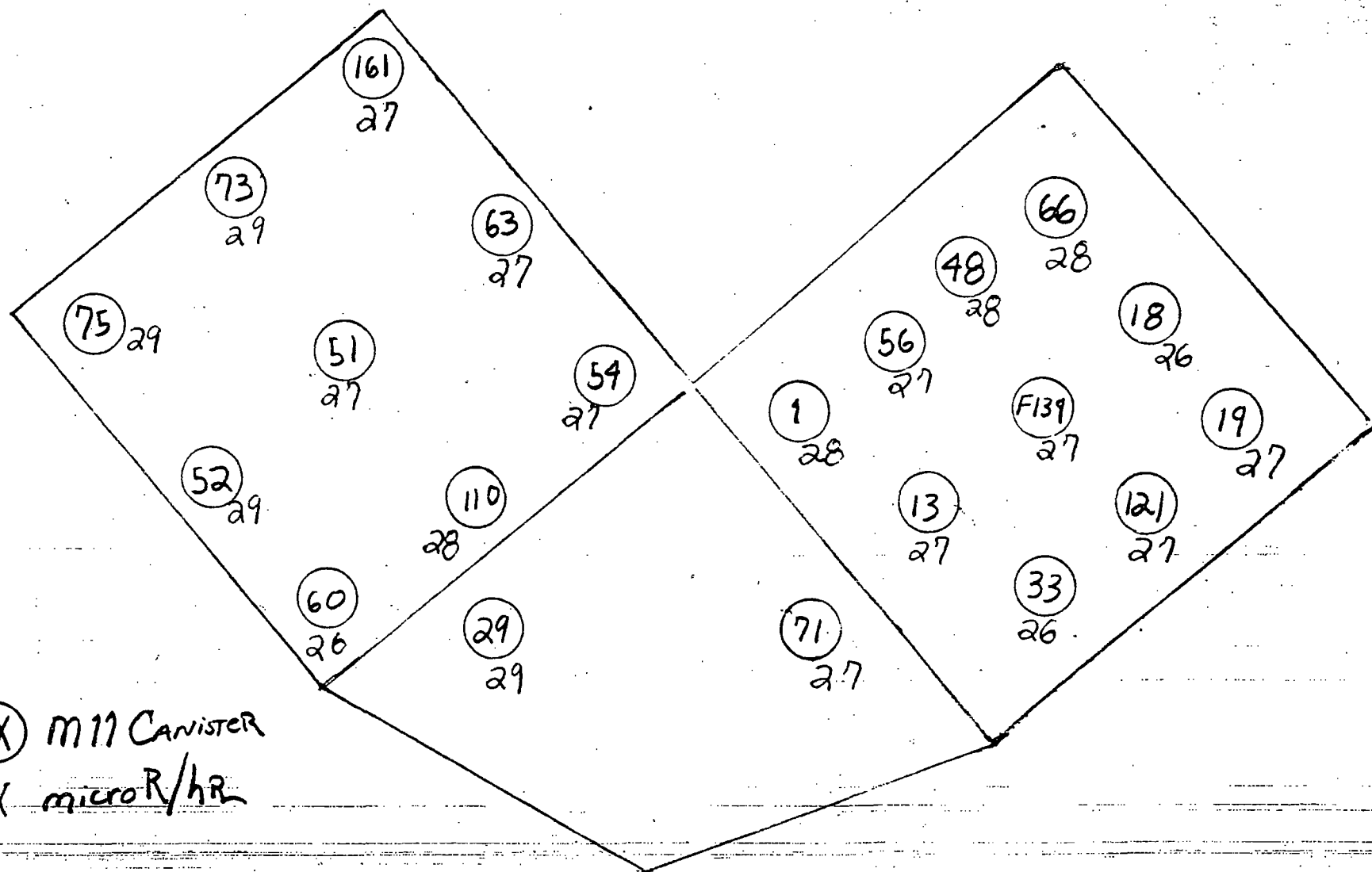
D'. 5.2 ± .1

*Counting error

†Core samples A,B,C,D,L^B were taken before addition of fill from spoil bank.



XX M11 CANISTER
XX microR/hr



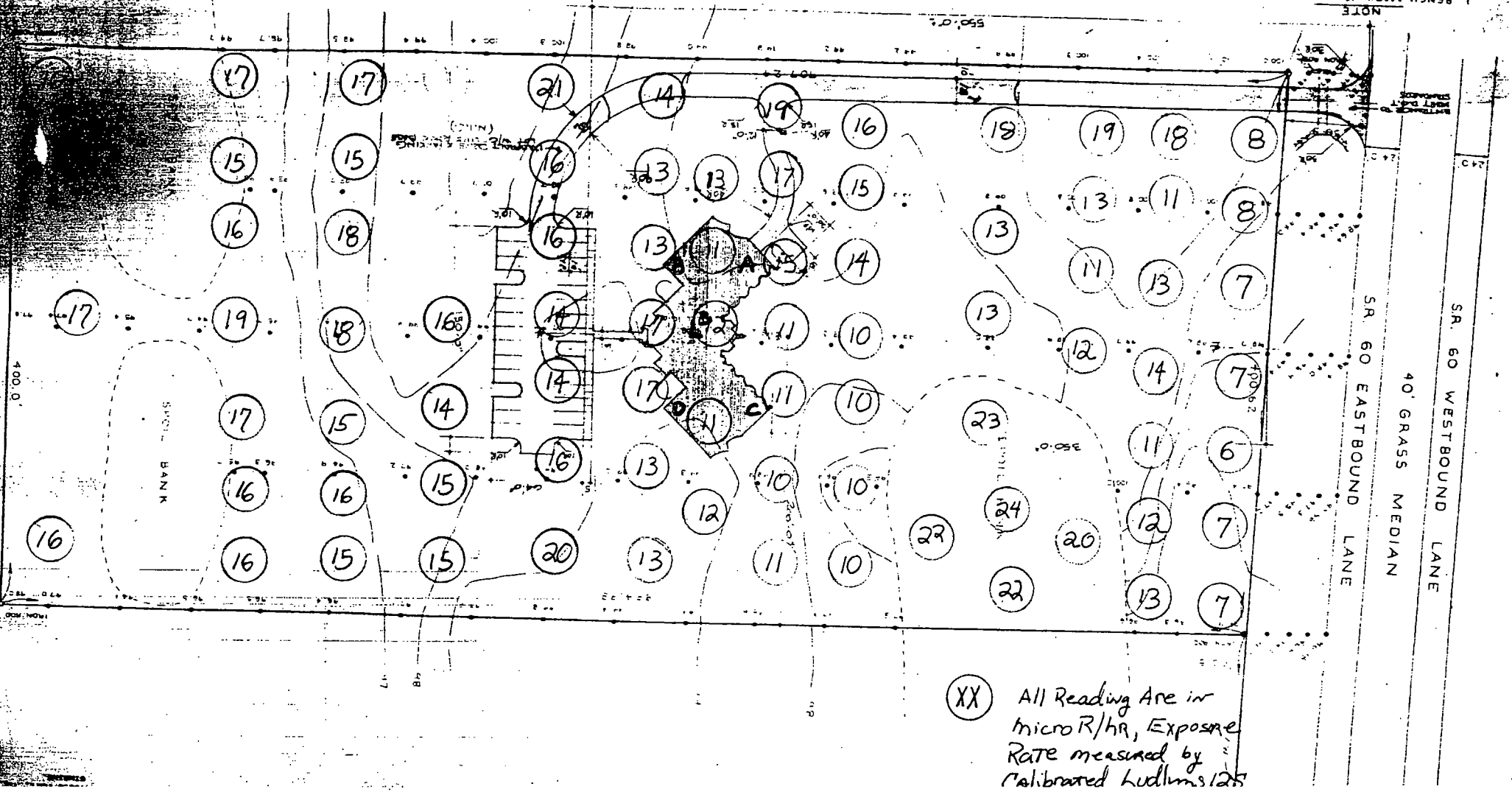
XX M11 CANISTER
XX microR/hr

SITE PLAN



CHASTAIN - SKILLMAN, INC. 9/29/80
 2. PROPERTY CORNERS SET AS SHOWN BY
 PROPERTY CORNER ASSUMED ELEV. +100.00
 1. BENCH MARK IS IRON ROD AT THE N.W. CORNER

NOTE



XX All Reading Are in
 micro R/hr, Exposure
 Rate measured by
 calibrated Ludlum 5125

POLK COUNTY HEALTH DEPARTMENT

FIELD REPORT ON Florida Institute of Phosphate Research
TOWN VISITED State Road 60, Bartow, Florida DATE _____
OWNER OF PROPERTY _____ PERSON SEEN _____
BY WHOM N. M. Gilley / J. W. Nall TIME SPENT _____
REASON FOR VISIT _____

REPORT: As requested by Dr. David Boris, soil samples were taken of the clay-sand mix utilized for the foundation of the new Institute building. Since the original soil strata did not adequately meet compaction specification, soils located on the north boundry of the site were utilized. This clay-sand mixture did meet the required compaction specification.

The building site was measured by calibrated scintillation rate meter, Ludlum 12S, both before and after the soil mixture was moved into the foundation area. The original exposure rate was found to be approximately 12 microR/hour gamma exposure at a height of 3 feet. The rate rose to approximately 27 microR/hour within the foundation area after back filling with the new soils.

Radon flux levels were measured by the charcoal canister technique. Mean flux rate was 5.53 pCi/m².sec for a sample size of 21 measurements with a standard deviation ~~(N-1 weighing)~~ of 1.89 pCi/m².second. The flux ranged from 1.84 to 9.03 within this sampling group. Flux measurements were made on the original soil strata with a mean flux of 2.02 pCi/m².sec.; ~~SD (N-1)~~ ^{Standard Deviation} - 0.97, ranging from 0.6 to 3.9 pCi/m².sec.

The Radium-226 content of the original soils were measured by ~~chemical extraction and electronic detection of the radon daughters~~ ^{the radon emanation technique.} (The mean radium content was 4.81 pCi/gram, standard deviation ~~(N-1 weighing)~~ of 0.59. The new foundation material was measured by gamma spectroscopy methodology and resulted in findings of 12.8, 13.1, 16.6 and 5.8 pCi/gram for four different samples taken from the soils utilized for the new foundation. The gamma spectrophy method was utilized to expedite analysis since the other methodology requires a time frame of four weeks per sample.)

A comparison with another parcel of property may be drawn from the following table:
(Please note that control technologies were utilized in the construction of the building.)

Florida Institute

Comparison Site

	Before Addition of Clay-Sand Mix	After Addition of Clay-Sand Mix	
Soil Radium	4.81 pCi/gram SD(N-1) 0.59	5.6, 12.8, 13.1 & 16.6 pCi/gram	15.8 pCi/gram SD (N-1) = 1.55
Rnflux	2.02 pCi/m2sec SD (N-1) 0.97	5.53 pCi/m2sec SD (N-1) = 1.89	5.44 pCi/m2sec SD (N-1) 2.51
Gamma Exposure	12 uR/hr	27 uR/hr	25 uR/hr
Indoor WL	Not applicable	Not applicable	0.019 WL SD (N-1) 0.0014

DATE 7 October 81
SYSTEM EFF: 0.206 CPM/PCI

RADON FLUX DATA SHEET

Polk County Health Department
Radiological Health Section

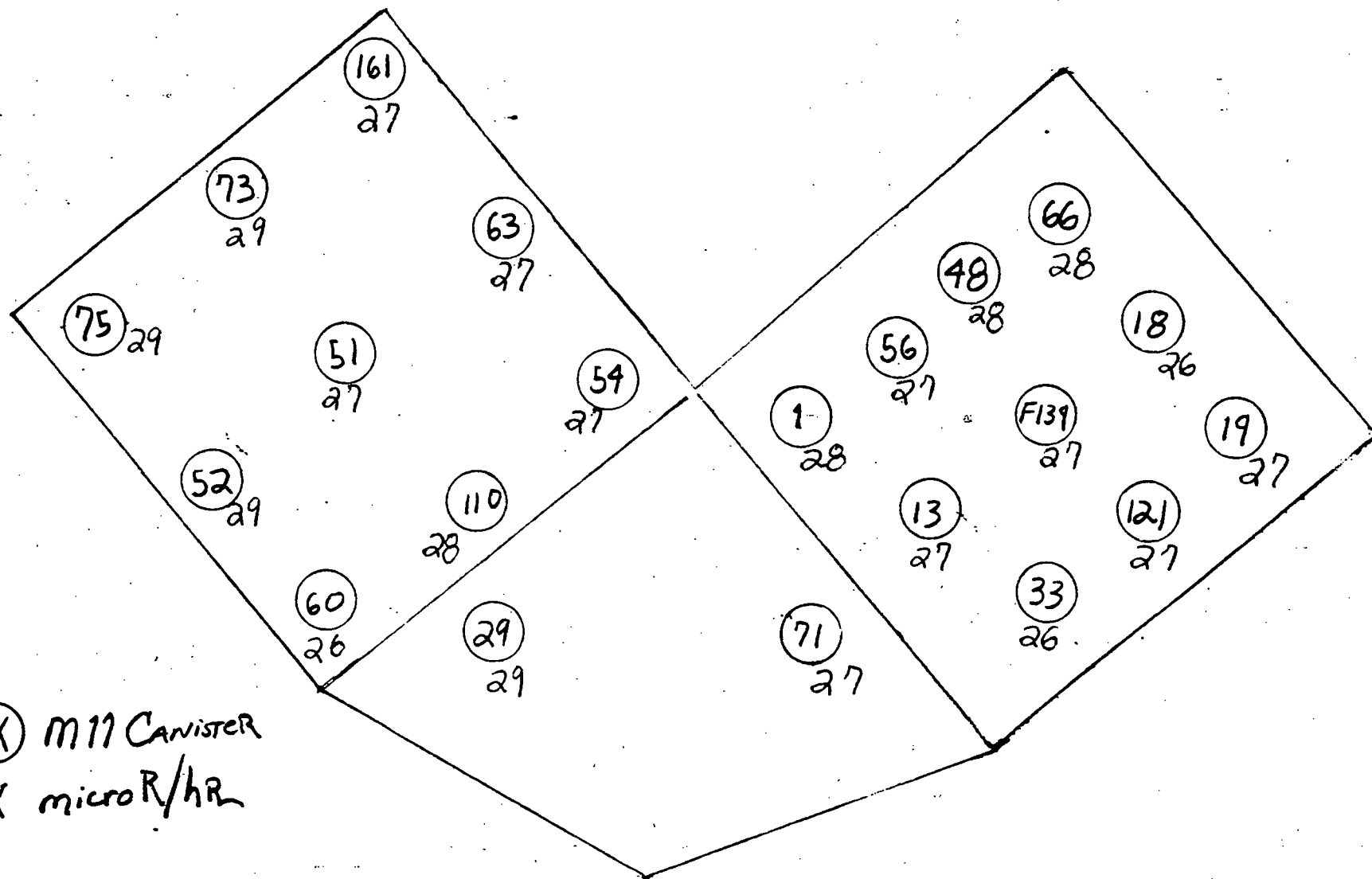
Deployed by NMG/JWN
Retrieved by " "

Analyzed by NMG

SAMPLE LOCATION	CANISTER NUMBER	DATE START	TIME STOP	READ	NET CPM	pCi/m ² sec 222 Rn FLUX	REMARKS
Dr. David Boris	*	5 Oct.	7 Oct.	7 Oct.			
Fla. Institute of	1	12:30	9:00	12:31	1077.0	4.56	
Phosphate Research	56	12:30	9:30	12:53	434.4	1.84	
	48	12:30	9:00	13:37	1372.4	5.86	
	66	12:35	9:00	11:08	573.3	2.40	
	18	12:35	9:03	13:08	1394.2	5.93	
	13	12:35	9:03	13:48	1333.6	5.70	
	F139	12:37	9:03	13:26	1020.8	4.35	
	33	12:37	9:03	13:14	1241.7	5.29	
	121	12:37	9:05	11:20	1419.7	5.95	
	19	12:38	9:05	12:42	1264.6	5.36	
	54	12:41	9:05	14:49	1216.1	5.24	
	63	12:41	9:05	14:19	1152.2	4.95	
	161	12:43	9:00	14:39	2091.4	9.03	
	73	12:43	9:00	14:09	563.1	2.42	
	75	12:45	9:00	13:58	1562.2	6.72	
	52	12:45	9:00	14:29	1629.7	7.03	
	60	12:45	9:03	15:29	1685.0	7.31	
	F110	12:47	9:03	15:19	1205.7	5.23	
	51	12:45	9:03	15:09	1745.0	7.56	
	43	12:50	9:05	15:39	2031.2	8.83	
	77	12:50	9:05	15:49	1072.5	4.67	

COMMENTS:

$\bar{X} = 5.53 \text{ pCi/m}^2 \text{ sec}$ SD $(N-1) = 1.89$
Range 1.84 to 9.03 pCi/m² sec.



XX M11 CANISTER
XX microR/hr

SOIL CORE SAMPLES[†] (0-6') Ra 226 IN pCi/gram

L^B (each interval tested)

0 - 1'	4.9 ± .1*
1 - 2'	4.2 ± .1
2 - 3'	5.3 ± .1
3 - 4'	4.8 ± .1
4 - 5'	4.9 ± .1
5 - 6'	5.7 ± .2

A (composite) 5.4 ± .1

B 4.7 ± .1

C 4.3 ± .1

D 5.4 ± .1

The following cores were taken from undisturbed soil on the north side of Highway 60.

E 3.8 ± .1

F 2.6 ± .1

G 2.3 ± .1

The following samples are not cores. They were taken from the spoil bank used for fill for the foundation.

A' 11.8 ± .2

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C' 16.3 ± .2

D' 5.2 ± .1

*Counting error.

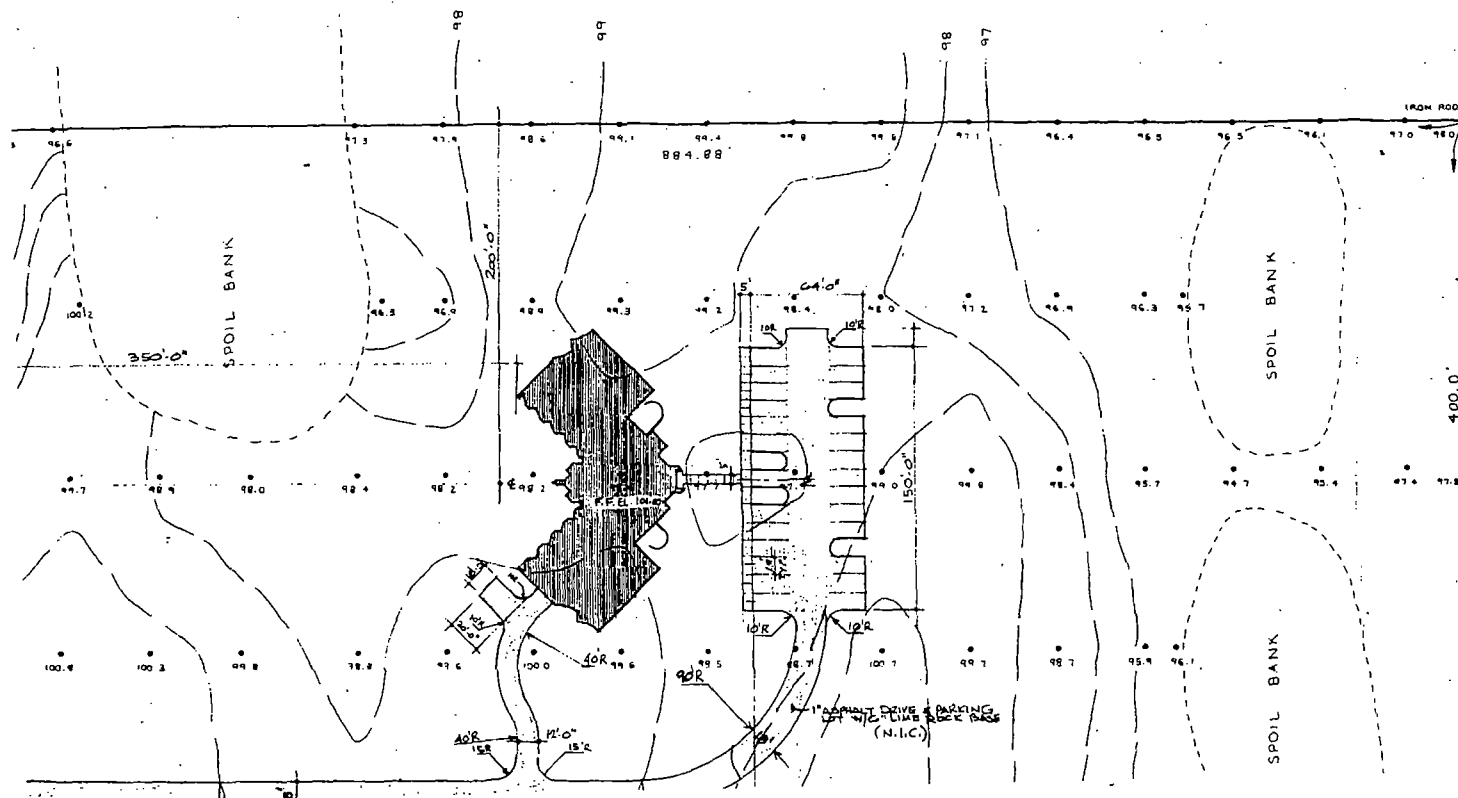
† Core samples A, B, C, D, L^B were taken before addition of fill from spoil bank.

N - 00° 30' 00" - E
692.50'

SOUTHEAST CORNER OF SECTION 1,
TOWNSHIP 30 SOUTH RANGE 24
EAST POLK COUNTY, FLORIDA

LEGAL DESCRIPTION

COMMENCE AT THE SOUTHEAST CORNER OF SECTION 1, TOWNSHIP 30S, RANGE 24E, POLK COUNTY, FLORIDA, THENCE N-00°30'00"-E, ALONG THE EAST LINE OF SAID SECTION 1, A DISTANCE OF 492.50 FEET TO THE SOUTH RIGHT-OF-WAY LINE OF STATE ROAD NO. 40, THENCE N-88°48'00"-W ALONG SAID SOUTH RIGHT-OF-WAY LINE 1704.08 FEET TO THE POINT OF BEGINNING. THENCE CONTINUE NORTH 88°48'00"-W ALONG SAID SOUTH RIGHT-OF-WAY LINE 400.62 FEET, THENCE SOUTH 907.24 FEET, THENCE EAST 480.0 FEET, THENCE NORTH 884.88 FEET TO THE POINT OF BEGINNING.



STRAUBIN
SURVEYING
ENGINEERS
802

TABLE 3.3-1
SUMMARY OF RADIOLOGICAL CHARACTERISTICS
OF VARIOUS LAND TYPES - POLK COUNTY

Land Type	Surface Soil (0-0.3m) ²²⁶ Ra		Soil Core (0-1.8m) ²²⁶ Ra		Gamma Level		Radon Flux	
	N	Mean (range)	N	Mean (range)	N	Mean (range)	N	Mean (range)
Unaltered	20	0.6(0.1-3.8)	18	0.4(0.2-3.1)	9	5(4-7)	17	0.2(<0.1-1.7)
Unmined	2	3.2(2.5-4.1)	2	2.2(1.1-4.4)	1	9 ---	2	1.3(0.6-2.8)
Radioactive								
Fill								
Tailings	20	3.2(0.4-9.2)	16	3.1(0.5-8.7)	11	11(6-16)	19	0.7(<0.1-2.7)
All	23	5.0(0.8-35.3)	24	5.3(1.0-23.1)	16	13(7-33)	27	1.5(<0.1-12.8)
Overburden ^{a)}								
Capped and	6	6.8(3.3-14.6)	6	7.4(2.8-18.3)	6	17(11-24)	6	1.6(0.3-7.2)
Mixed Clays ^{b)}								
Debris	18	9.5(3.4-23.3)	18	7.3(3.1-24.7)	8	22(11-54)	15	4.2(1.7-13.7)

N = Number of sites in summary

Means are geometric means of average values for N sites of indicated land type

a) Overburden category includes reclaimed overburden piles and sand-fill reclamations capped with overburden

b) Clay category includes settled clays areas capped with overburden and/or tailings and clay-sand mixtures capped with overburden

SOURCE: ROESSLER, 1978

BOXES

Peak Channel 369 = Re^{222} 168 keV

Window 338-399

400 grams EACH

cts BACK
1.05 cps Eff = .287

25pci 10K 82,250 CTS

8.225 cts/sec

10pci 1K 3,915 CTS

3.915 cts/sec

16pci 1K 6,407

6.407

20 1K 7,585

7.585

BKGW

NO DIRT

2.123

2020

25-10 .202

3.175

25-16 .287

1.05 X

10-16 .415 *

3.92

25-20 .128 *

5.025 X

20-10 .367

2.45

20-16 .2945

1.675

2880

80 1470

D=

282.25
SD 105

TAN A 5.1745 = 13.08 pci

Whitey B 5.096 = 12.81

C 6.202 = 16.6 pci

SOIL CORE SAMPLES (0-6') Ra 226 IN pCi/g

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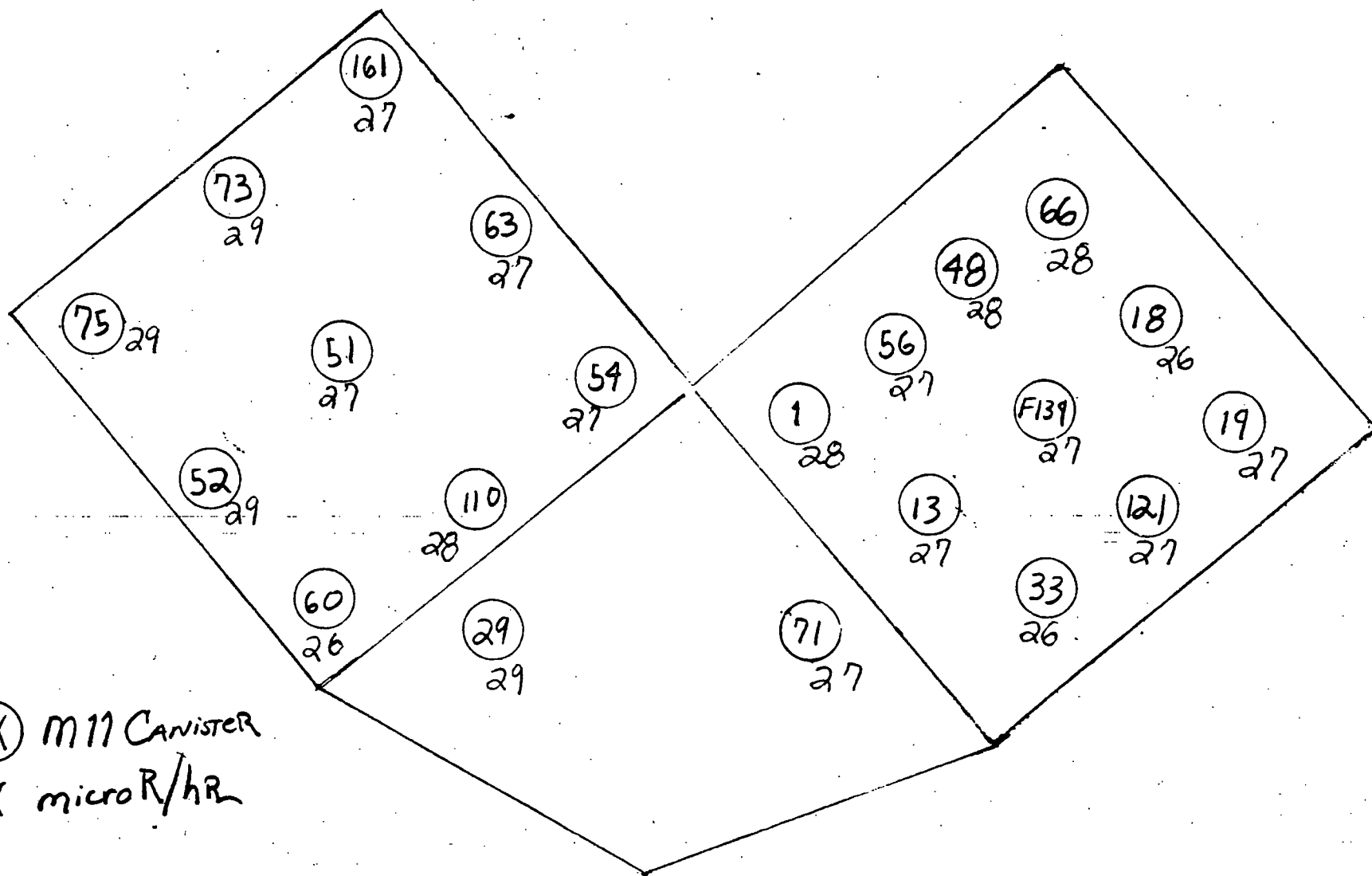
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(XX) M11 Canister
XX microR/hr

DATE 7 October 81
 SYSTEM EFF: 0.206 CPM/PCI

RADON FLUX DATA SHEET

Polk County Health Department
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Deployed by NMG/JWN
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SITE PLAN



CHASTAIN - SULLIVAN, INC. 4/29/80
 2. PROPERTY CORNERS SET AS SHOWN BY
 PROPERTY CORNER ASSUMED ELEV. 100.00
 1. BENCH MARK IS IRON ROD AT THE NORTHWEST

NOTE

